

Notice of Allowability**Application No.**

10/786,443

Examiner

STEPHEN YAM

Applicant(s)

CATHEY ET AL.

Art Unit

2878

- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to after-final amendment filed 1/21/2009 and interview with applicant conducted 1/29/2009.
2. ☒ The allowed claim(s) is/are 1-4, 6-16, 18-30 and 41-49.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some* c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
(a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
(b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date 3/17/2008
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☒ Interview Summary (PTO-413),
Paper No./Mail Date _____.
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

/Stephen Yam/
Primary Examiner, Art Unit 2878

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with John Lindemann on January 30, 2009.

The application has been amended as follows:

Cancel Claims 32-40.

Enter new Claims 41-49 as follows:

41. A non-linear optical system for imaging an object comprising:
optics for focusing and encoding a wavefront from the object to an intermediate image such that an optical transfer function of the optical system, at the intermediate image, is more invariant to focus-related aberrations as compared to an intermediate image formed by the optics without encoding;
a non-linear detector for detecting the intermediate image; and
a linearization processor for linearizing the intermediate image to form a linearized image, by measuring an exposure curve within an image detected by the nonlinear detector and by converting the exposure curve into a substantially linear exposure curve.

42. The optical system of claim 41, wherein the optics comprise a phase mask that modifies the optical transfer function of the optical system by affecting phase of the wavefronts transmitted by the phase mask.

43. The system of claim 41, wherein the aberrations include one or more of misfocus, spherical aberration, astigmatism, field curvature, chromatic aberration, temperature induced misfocus aberration, and pressure induced misfocus aberration.

44. A system of claim 41, further comprising a post processor for filtering the linearized image by removing effects of wavefront coding therefrom to form a final image.

45. The system of claim 41, the exposure curve comprising an overexposed region and an underexposed region, wherein any part of an image falling into the underexposed region or the overexposed region is not recorded by the detector.

46. The system of claim 41, the non-linear detector comprising a non-linear digital detector.

47. The system of claim 46, wherein the non-linear digital detector comprises CMOS detector elements and circuitry to extend dynamic range.

48. The system of claim 46, wherein the non-linear digital detector comprises a digital circuit with different responses for different pixels.

49. The system of claim 46, wherein the non-linear digital detector comprises a digital circuit with detectors having logarithmic response.

EXAMINER'S COMMENT

New Claim 41 recites the limitations of previous Claim 9 (and parent Claim 1), which Examiner objected to in the Final office action as being allowable if placed in dependent form.

The reasons for allowance were previously asserted in the Final Office Action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to STEPHEN YAM whose telephone number is (571)272-2449. The examiner can normally be reached on Monday-Friday 8:30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Epps can be reached on (571)272-2328. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Stephen Yam/
Primary Examiner, Art Unit 2878